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AUTHOR Bartlett, Brendan John
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ABSTRACT

A reader's ability to recognize an author's top-level structure in a passage is a useful strategy for organizing textual information for memory purposes. Even without specialized training, many adults and some fifth grade children have this ability. Other children in fifth and ninth grades, and in classes for the mildly mentally handicapped, have been trained to use this strategy with consequent improvement in memory performance. Research evidence shows that those who make strategic use of knowledge about text structure are likely to be better at comprehending reading material. A case can also be made that a reader's use of this strategy increases the likelihood that he or she will select and remember the main idea intended by a writer, and that where such selection is adequate and appropriate, a reader will better comprehend the message of a text. (FL)

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Brendan John Bartlett,
Mount Gravatt College of Advanced Education,
P.O. Box 82, Mount Gravatt,
AUSTRALIA. 4122

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SO THIS IS THE MAIN IDEA : WHERE USE OF AN AUTHOR'S TOP-LEVEL STRUCTURE HELPS A READER

Presented at the
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Manila, Phillipines,

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Issues of the Review

In this paper is presented an account of how the deliberate reading and memory strategy of using an author's top-level structure beneficially affects recall and comprehension of classroom text.

Particularly, an age range is outlined within which readers seem capable of strategically approaching the task of reading for memory by searching and using top-level structure in a way which affects memory performance.

Second, those who use the strategy appear to improve memory performance in a predictable pattern. Characteristically, certain

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information in text is better recalled when readers use the strategy. Most notably, use of an author's top-level structure improves the likelihood that the main idea of a passage will be recognized and remembered.

Some operational definitions. By *strategy* is meant a planful approach to selecting, processing, storing and retrieving information.

By *an author's top-level structure* is meant an organization used by an author to frame the critical information or main idea of an intended communication. As such, *top-level structure* differs from *mid-level structure* which is an organizational system for those major ideas used to support the main idea, and from *low-level structure* which serves to relate minor details to superordinate information.

A Selected Review of the Literature

Benefits of the Strategy. Strategic use of an author's top-level structure has at least two major benefits related to memory performance. Readers remember more of what they have read (1, 19) and remember more of the most important information (1, 3, 4, 18, 20). These benefits contrast with recall performance of other readers who do not use the strategy (1, 18, 22) and with prior performance of readers taught to search for and use an author's top-level structure (1, 4, 5).

Recently, two further advantages have been demonstrated for readers aware of the purpose and uses of top-level structure. Bartlett, Turner and Mathams (5) trained pupils of 5th grade to recognize four types of top-level structure in text and to plan written composition in terms of an obvious top-level structure. In addition to the recall benefits previously described, those who responded to training were better able to reorganize muddled text encountered during training. Further, these pupils were able to generate clearer, better-organized, written composition than they had done previously or than that produced by nonusers.

The first of these findings strengthens an interpretation (19) of the Kintsch, Mandel and Kozminsky (17) data that given enough time, readers who possess knowledge of top-level structures can use it in unravelling deliberately disorganized, experimental passages. The second finding reflects the close relation between reading and writing as processing tasks. The portability of a helpful plan for reading into the area of writing seems to have benefited the 5th graders in planning, producing, and editing their written composition (5).

Thus, advantages of awareness of structure in writing can be accrued by readers who act on it in remembering text or in making sense of poorly organized text. Evidence cited previously is indicative that such awareness need be only of structure at its top-level, that is, of structure which binds together the most important of an author's information into a main idea.

Which comes first, top-level structure or main idea? It has been noted (18, 19, 22, 24) that readers recall best that information high in the structure of text content. However, it is not always a simple matter for readers to discern structure. Often, structure is poorly signalled (1). Otherwise, readers may be unaware of the variable, or fail to utilize knowledge of it. Where a reader does find an organizational pattern in text, either deliberately or incidentally, then that perception and the author's intended top-level structure may not coincide. In all such cases, what a reader is likely to remember is not what the author had considered most important.

If finding a writer's main idea uniformly across readers is a desired outcome of reading, then a sufficient condition in determining most critical information is for the reader to recognize top-level structure used by the writer. In this sense the question of this section is answered. Finding the top-level structure seems generally to precipitate awareness of content which can be instantiated into a frame provided by the structure. Recognition of structure precedes identification of main idea. However, the margin of difference is so small, that the two seem virtually simultaneous behaviours in a sequence for skilled reading.

How does a reader find the top-level structure of a text? Techniques of prose analysis exist for determining the structural organization of written material (6, 10, 13, 16, 18, 25). Essentially, such techniques applied to a passage of text reveal which information is most important and which least important. This

is done by structuring content into levels of relevant importance. Hence, finding top-level structure should reveal most important content. However, present technology of this type is complex and unwieldly in terms of how most readers might approach the task of finding the idea of a passage.

A useful system in teaching young students (5th - 9th grade) to find top-level structure (1, 4, 5) is to acquaint them with a finite set of structures and with knowledge of value in strategically using an author's top-level structure. This has been done (1, 4, 5) by discussing with students the general nature of pattern in text organization and the specific nature of four types of structure commonly found in expository text. The four types, comparison, covariance, response and attribution are described elsewhere (1, 4, 18, 19). Discussion and instructional exercises were devised and used to give students practice in expecting a top-level structure in material to be read, and skill in acting on this expectancy by confirming the presence or absence of one of the formats. In the event of perceived absence, students in these programs were encouraged to impose one of the top-level structures.

An attribution of the Bartlett programs (1, 4, 5) is that on post-program testing most students have been able to verbalize their behaviours in searching for top-level structure when reading and in using that same structure when organizing recall. It seems the verbalization represents metacognitive processing at a greater depth than in spontaneous use of the strategy where students are unable to describe what it is they are doing (1, 5). In terms of a depth-of-

processing model (9), students who do process information about the strategic behaviour at deeper levels are more likely to retain knowledge of the strategy, and to produce the strategy in appropriate situations.

In summary, an answer to the question of this section is that a first stage in finding top-level structure when reading is awareness of structure. A second stage is knowledge of different types of top-level structure which might be present in a text. A third stage is expectations of finding top-level structure as an organizational format. A fourth stage is confirmation of presence or absence of a familiar structure. Finally, a reader should act on preceding stages by utilizing the detected structure to process text information. This may involve the imposition of a known structure where an author's format cannot be detected readily.

This answer leads to discussion of the central concerns of this paper. For what group of students can the strategy of top-level structure be used, and used to improve memory performance? And, what characteristic improvements in memory performance result from an acquired use of the strategy?

A Tentative Age Range for Spontaneous and Induced Use of the Strategy.

Spontaneous use of the strategy. Children in 5th grade can use an author's organization to help reconstruct what they have read

in a classroom text (5). So too can most adults (21, 23, 24). It is not yet known if children younger than 5th graders can use the strategy, though some anecodotal evidence suggesting so does exist (3). Currently, research as shown in Table 1 marks a convenient range within which onset of the strategy, and effects of its induction may be discussed.

Insert Table 1 about here

By the 5th grade, one in 10 readers has developed the strategy of finding and using top-level structure as an aid to memory (5). The child in question is able to verbalize the strategic behaviour, but is not likely to be consistent in producing it. Bartlett, Turner and Mathams (5) found in a repeated-measures situation that none of those who used the strategy on one occasion repeated this behaviour on later tests unless spedifically trained to do so.

The finding with 5th graders compares with similar evidence (1) that few 9th graders who develop the strategy naturally are consistent in using it. Certainly, by the ninth year of schooling, more students have acquired the strategy. In a survey of junior-high readers (1) it was found that one in nine students, spontaneously found an author's top-level structure in a test passage, used it to organize a retelling of what had been read, and, correctly labelled the structure involved. Yet, in the absence of formal training, only one in six of these skilled students continued to use the strategy at this level of awareness in later tests of memory.

Written records of what 6th graders remember from text often are constructed with the same top-level organization as in the original (12). Four in ten 6th graders appear to do this (12). However, this figure does not discriminate between those who could label or verbalize what they had done and those who could not. Thus, comparison with figures of one in 10 5th graders (5), one in nine 9th graders (1), and no spontaneous use for mildly mentally-handicapped adolescents (4) must be qualified. It is likely in view of this comparative research that many in Elliott's (12), study who used the author's top-level structure may have had little intentional purpose in doing so.

Bartlett and Briese (4) worked with mildly intellectually handicapped (M.I.H.) students, closely equivalent in chronological age (C.A.) with those surveyed in the junior-high sample (1). Additionally, the adolescents had proximal mental-age (M.A.) equivalence with 5th and 6th graders who were subjects of other studies (5, 12). But, measures of spontaneous production of the strategy by M.I.H. students differed sharply from those of their C.A., or M.A. equivalents. None of the M.I.H. adolescents spontaneously used the top-level structure of a text as an organizational strategy for remembering textual information.

Coupled with a second finding that when trained to use the strategy many M.I.H. students did so inappropriately, or with minimal effect, evidence of lack of spontaneous production within the sample (4) supports a proposition that organizational strategies are

inadequately used by the retarded (1, 14, 26).

Beyond the age range of 9th grade students some data exist for college-level students (18, 19, 20, 21) and for adults (23, 24). However, this data are not explicit in drawing incidence figures and do not discriminate those who labeled or verbalized the behaviour of using an author's top-level structure from those who did not. Hence, comparison with figures for 5th graders, 9th graders, and M.I.H. adolescents may be made only at gross levels. However, the research with college students and adults generally has shown high relation between use of the strategy and memory performance (19). Interestingly from a developmental viewpoint, no difference has been observed in whether or not organizational use is made of an author's top-level structure by adults across wide age ranges (24).

Induced use of the strategy. A comparison of training effects is shown in Table 1. In each of three studies where extensive instruction was provided, students acquired skill in implementing as a memory aid the top-level structure of text (1, 4, 5).

Ninth-graders who had not used the strategy previously became more deliberate in planning strategic recall and were highly successful in locating and using an author's top-level structure (1). A consequence of this induced strategy was significant improvement in the quantity of recall.

When provided with extensive training and opportunity to practice, a significant number of 5th graders acquired the strategy and improved memory performance (5). As with the 9th graders, acquisition and recall effects were demonstrated by 5th grade readers immediately after training and following a three-week delay.

Adolescent students, classified as mildly intellectually-handicapped also have responded to training in use of the strategy (4). However, few reached a level of strategic performance where they could actually verbalize what they were doing or could label a perceived top-level structure consistent with that they had used. Instead, three in four reached an intermediate level, a level where execution of the strategy was in some way faulty. Some students when reading erroneously identified the top-level structure and when writing, imposed the error as an organizational frame for recall. Others correctly identified the structure yet used a different one in recalling. Still others erroneously identified the structure and then imposed one different both from their own choice and from the original. Despite this failure to become appropriately aware of top-level structure as a strategic device, those who reached the intermediate level improved memory performance immediately after and three weeks following instruction.

Summary. A reader's skill in recognizing top-level structure in a passage is a useful basis for organizing textual information for memory purposes. Even without specialized training, many adults and some children in the 5th grade have this skill. Others in 5th grade,

9th grade, and classes for mildly intellectually-handicapped have been trained to use it with consequent improvement in memory performance.

There is evidence (5, 22) that those who make strategic use of knowledge about text structure are likely to be better comprehenders of reading material. In the following section a case will be made that a reader's use of strategy increases the likelihood that the main idea intended by a writer will be selected and remembered from reading. Where such selection is adequate and appropriate a reader will better comprehend the message of a text.

A Relation between Use of the Strategy and Location of the Main Idea.

What the strategy does. A reader who finds textual information organized in an identifiable way has a systematic basis for processing that information when reading (1, 4, 5, 19). For example, a *comparison top-level structure* points out similarities or differences between two or more clusters of information. Whether by direct comparison, analogy, provision of alternative arguments equally or unequally weighted, or contrast, a top-level structure of this type will organize a main idea as the topic of the comparison.

A text contrasting three different types of muscles was used in the Bartlett, Turner and Mathams study (5). It compared the way in which each type worked, gave examples and listed attributes of some of the examples. The main idea was that some muscles work only when you want them to, others whether you want them to or not, and still others have both properties.

A schema of the text is provided in Figure 1. The main idea is organized as a comparison of how the three types of muscles work. Major supporting argument is provided for each position at equivalent levels of importance. Similarly, specific information which adds finer detail to the respective arguments is clusted in a comparative frame.

Insert Figure 1 about here

Knowledge of the comparison structure will enable a reader to seek out propositions in the text supporting each position in the comparison. These propositions may be ordered in terms of whether they unbalance the comparison as first, major information supporting the main idea, and then, qualifying details for the major support are sorted, i.e. is there stronger argument or greater evidence for position A over alternate positions? In this type of ordering, top-down or vertical cueing within each position is complemented by horizontal or cross-wise cueing. In the latter, evidence supporting position A is weighed against corresponding evidence for position B at the various levels of relative importance.

Thus, a reader of the text outlined in Figure 1 in classifying arm and leg muscles as muscles that *work when you want them to*, may search for examples of muscles that *work whether you want them to or not* and find instantiation in text content about heart and stomach muscles. Similarly, the cross-wise cue may prompt a search and processing for text information about muscles used in breathing which

work *whether you are asleep or awake.* Attributions found for *heart muscles* may set up a cross-wise search for attributions for *stomach muscles,* and for *arm* and *leg muscles.*

Often, appropriate information is not available in the text itself to fulfill such a search. In such cases a reader may note and record absence of the information, or note the absence and use prior knowledge to fill out missing information. The latter process represents elaboration or intrusion into text content (5, 13) and is not an uncommon practice. For example, several 5th graders recalled specific examples of voluntary muscles (arm, leg muscles) and involuntary muscles (heart, stomach muscles) which had appeared in text. Many of these same students then recalled a specific example of muscles with both properties (lung muscles) even though only superordinate information (muscles used in breathing) and no specific examples had appeared in text (5).

It seems that cross-wise cueing may provide a basis for better understanding intrusion and elaboration in literal recall.

Effects on recall of information supporting the main idea. In a study with adults at various age levels, characteristic differences in type of information recalled were shown for young (20 - 33 years) middle level (41 - 55 years) and older (58 - 79 years) groups (24). No differences in use of the strategy were recorded and all groups recalled equally well, information from the top-level structure. However, the younger adults tended to recall more information from mid-level structure in supporting a main idea whereas middle-level and older adults recalled more of the specific details found in the text's

low-level structure. This difference may result from differences in the type of classifying and organizing tasks dominant in the day-to-day functions of each group. Meyer, Rice, Knight and Jessen (24) interpreted the finding more-or-less in these terms and rejected notions of underlying distractibility or deficits in organizational skill for the middle-level and older adult groups.

But, a similar pattern of recall to that of middle-level and older adult groups has been found with M.I.H. adolescents taught to use the strategy as an organizational device (4). Those M.I.H. students who used top-level structure, generally recalled the main idea. But, much of the remaining content of recall was of information from the low-level structure of the test passage. Additionally, improvement in memory performance following training tended to result from recall of discrete idea units rather than of idea and relational units. Relations used to bind together ideas remembered from the text rarely were those used in the original text. Thus a student's record of memory performance often appeared quite different from the original text despite reproduction of the main idea. This finding prompted the researchers to write:

> It seems that the M.I.H. pupil in recalling information is more likely to *construct* an account based on ideas or thoughts as they occur to him/her, rather than to attempt a systematic, planful *reconstruction* of text information (Bartlett and Briese, 4, p. 71).

The lower-level type of information recalled by older adults (24) and M.I.H. adolescents (4) to support a remembered, main idea may in fact represent deficits for these groups in capitalizing on a strategic performance. This could occur if the recall of a main idea does not properly cue major supporting information in a systematic, top-down, vertical fashion. This speculation is strengthened by evidence that M.I.H. students after recalling main idea information made little use of relation-type units from the original text in binding supplementary information. It is also in accord with developmental evidence suggesting faulty use of organizational strategies by the very young (8), by the old (11, 15) and by the intellectually retarded (7, 14, 26).

An alternative explanation for the recall performance is that M.I.H. students familiar with top-level structure preferred to use a recall strategy of keywording. Where keywording was based on information in the top-level structure of the text, the main idea may have been identified correctly. But, consequent contextual support is likely to have been provided by a student's prior knowledge of the keyword(s) rather than from memory of textual content. This area of speculation seems a fruitful one for further research in which systematic and controlled study of processing by M.I.H. and older adult subjects could be instigated.

Conclusion

Students who use knowledge of how an author has organized a written communication by seeking out the most salient level of that organization will discover certain information in text. By restating that information in terms of its organization, students will have recalled the essential message of the communication, the main idea. Research reported in this paper has shown that some youngsters do so naturally, others may be trained to use the strategy and so improve faculties for finding a main idea and remembering what they have read. Older students also respond both to natural unfoldment of the strategic behaviour and to programs of intervention. Again, increments in comprehension and memory performance have been associated with use of the strategy. While some questions have been raised by the differential recall performance of M.I.H. and older adult students, the strategy of finding an author's top-level structure and using it to organize recall is likely to improve a reader's chances of locating the main idea intended by an author and better comprehend and remember what the author intended to communicate.

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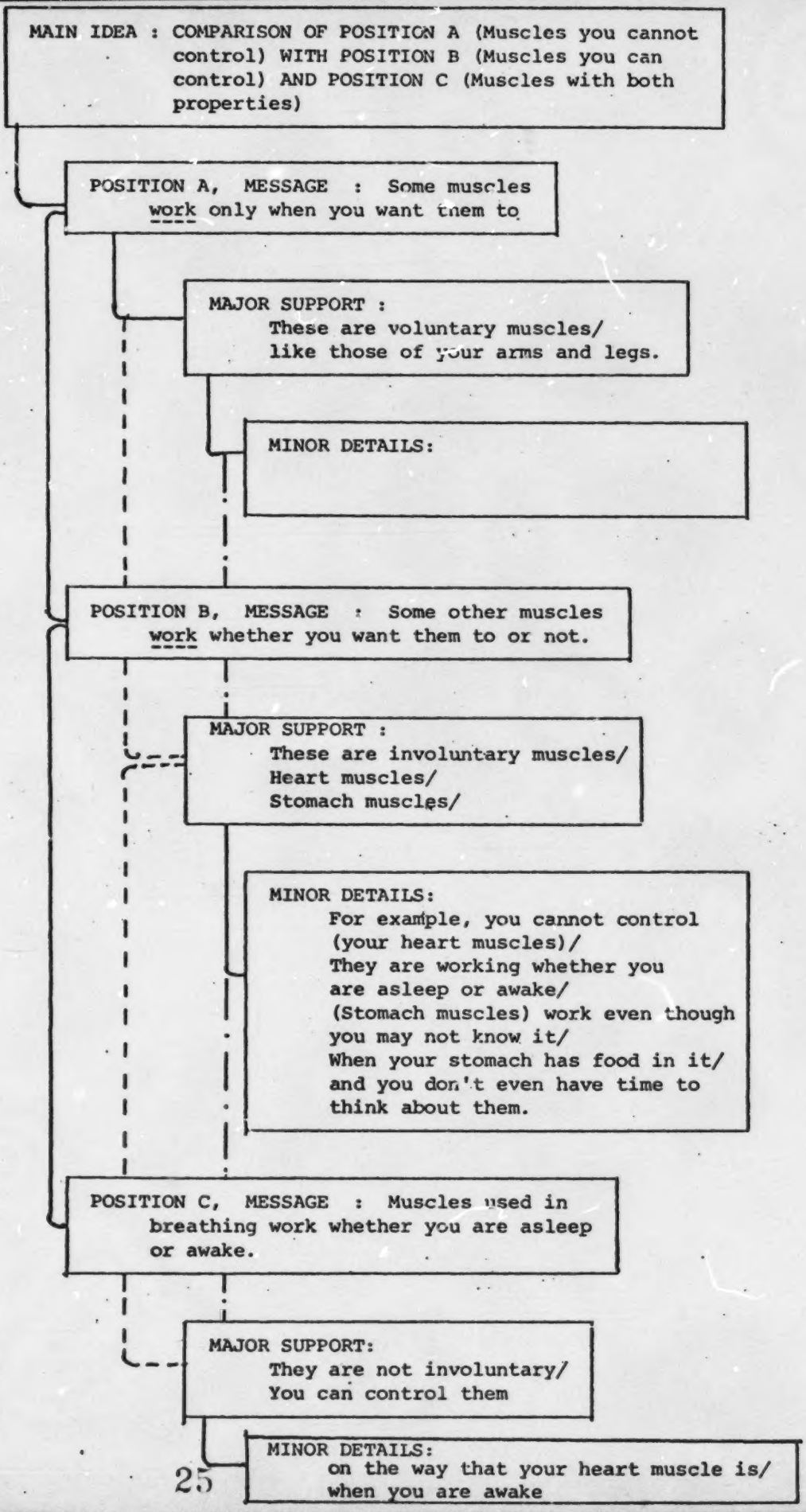
TABLE 1

Comparison of Findings from Three Studies in Which Use of Top-Level Structure and Recall Effects were Examined.

RESEARCHER	SAMPLE	SPONTANEOUS USE	CONSISTENT USE	RESPONSE TO TRAINING	IMPROVED MEMORY PERFORMANCE	MAINTENANCE OF EFFECTS	TRAINING PROGRAM
artlett (1978)	9th Year	1 in 9	1 in 50	47 of 53 (experimental group. N 53)	43 of 47	Still there on 3 week delay test. Still there on teacher's report 10 months later.	Five (5) daily sessions each of 1 hour.
artlett, Turner & athams (Note 8)	5th Year (N 70)	1 in 10	none	19 of 28 (experimental group N 28)	19 of 19	Still there on 3 week delay test (completed 20.5.80). No other evidence available at this stage.	Fourteen (14) sessions spaced over a 4 week period. Each session of about 30 minutes + Incidental back up as occasion arose.
artlett & Briese (1979)	Adolescent, M.I.H. seniors & prevocational (N 26)	none	none	19 of 26 (experimental group N 26)	17 of 19	Still there on 3 week delay test. No other evidence available since that test.	Ten (10), daily sessions of 10-20 mins. + Intermittent practice throughout the day.

Figure Captions

Figure 1 Schema of a comparison top-level structure used to organize text about muscles (Bartlett and Briese, 1979)


MAIN IDEA : COMPARISON OF POSITION A (Muscles you cannot control) WITH POSITION B (Muscles you can control) AND POSITION C (Muscles with both properties)
POSITION A, MESSAGE : Some muscles work only when you want them to
MAJOR SUPPORT : These are voluntary muscles/ like those of your arms and legs.
MINOR DETAILS:
POSITION B, MESSAGE : Some other muscles work whether you want them to or not.
MAJOR SUPPORT : These are involuntary muscles/ Heart muscles/ Stomach muscles/
MINOR DETAILS: For example, you cannot control (your heart muscles)/ They are working whether you are asleep or awake/ (Stomach muscles) work even though you may not know it/ When your stomach has food in it/ and you don't even have time to think about them.
POSITION C, MESSAGE : Muscles used in breathing work whether you are asleep or awake.
MAJOR SUPPORT: They are not involuntary/ You can control them
MINOR DETAILS: on the way that your heart muscle is/ when you are awake